

Date: Sat, 23 Jul 94 04:30:22 PDT  
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>  
Errors-To: Ham-Homebrew-Errors@UCSD.Edu  
Reply-To: Ham-Homebrew@UCSD.Edu  
Precedence: Bulk  
Subject: Ham-Homebrew Digest V94 #206  
To: Ham-Homebrew

Ham-Homebrew Digest                      Sat, 23 Jul 94                      Volume 94 : Issue    206

Today's Topics:

    Building a house: Special Consideration  
    Building a house: Special Considerations? (2 msgs)  
        Does anyone have info on QEX?  
        HELP ME MOD A 2m FM AMP FOR SSB  
        LF Band experience?  
        Reply to FFT Question  
    RF Feedback in Mic while talking and touching mic.  
        Two-meter satellite CW transmitter  
        VHF SWR meter

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>  
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.

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Date: Thu, 21 Jul 1994 19:39:45 GMT  
From: ihnp4.ucsd.edu!agate!biosci!netnews.synoptics.com!news@network.ucsd.edu  
Subject: Building a house: Special Consideration  
To: ham-homebrew@ucsd.edu

In article 774766639@BIX.com, hamilton@BIX.com (hamilton on BIX) writes:

>  
>  
>2. Put a cable chase up thru the core of the building if it's a  
> multi-story.

\*\*\*\* Amen to that! Remember, the service life of coax is only 5-10 years.

- Jerry Kaidor, KF6VB

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Date: Thu, 21 Jul 1994 15:55:38 GMT  
From: ihnp4.ucsd.edu!swrinde!emory!rsiatl!ke4zv!gary@network.ucsd.edu  
Subject: Building a house: Special Considerations?  
To: ham-homebrew@ucsd.edu

In article <Ct5A12.3x7@wybbs.mi.org> pete@wybbs.mi.org (Pete Hoffswell) writes:

>I am building a 1.5 story house, with a walkout basement, starting  
>next month. Anyone have any good ideas regarding building a new  
>house and amateur radio?

>

>So far I've thought up of the following, and would appreciate  
>anyone's comments:

>

>Grounding Rod: Punched in before basement cement is poured.  
>Should it be isolated from the basement floor?  
>(soil is sand, high water table (South west shoreline michigan))

You want to install a \*Ufer\* ground. A Ufer ground consists of rebar  
\*in\* the concrete. Make sure all the rebar is properly electrically  
bonded together before they pour the floor, and bring a termination  
out for the shack. You may want to sink some regular ground rods  
in the mesh below floor level as well before the concrete is poured.  
Connect them with minimum #8 solid wire back over to the shack  
termination point. That will become your single point ground for all  
of your equipment. (Concrete is a better conductor than dirt, take  
advantage of it. The concrete will \*not\* explode under lightning  
currents if there is sufficient rebar in it to spread the currents.  
If in doubt, consult a good text on Ufer grounding.)

Now is also a good time to get the tower base poured. It should be  
Ufer grounded as well, and in addition have a ground ring and ground  
rods installed at this time. Run a low inductance strap back from  
this to your single point in the shack. You may also want to do a  
protective loop around the perimeter of the house. This is just a  
#8 wire buried around the outside of the footings and connected  
\*at one point\* back to the shack single point connection. Don't  
make any other connections to this loop. (Obviously, tie any water  
piping, power, telco, and cable TV grounds back to your single  
point connection as well. \*NEVER DAISY CHAIN GROUNDS\* Everything  
must tie together only at the single point connection.)

>Antennas in roof:

>Can you lay a antenna on the roof, before laying down shingles, or  
>underlayment, or whatever? Would you have to limit your RF output?  
>I'll have vaulted ceilings, so there's no real attic.

Antennas work better when high and in the clear. You can lay an antenna in wooden construction, but be careful about power levels. Not only will the structure absorb some power, but the EM fields \*in\* the house will become quite high. This may be a significant bio-hazard. And it'll certainly be a potential source of EMI for other electrical and electronic equipment in the house.

>Cable runs: As the walls go up, what cable runs should I make up  
>them? The shack will be in the basement, and I'd like to run  
>a nice piece of coax up, with a remote antenna switch.

Run a 4 inch plastic or metal conduit up through the house for cable runs. Fit the conduit with a high quality pull rope so you can add cables at a later time. Also run an underground conduit out to the tower base. Make sure it slopes into a "dry well" at one end, and use 180 degree elbows at each end. The pull ropes should be \*twice\* the length of the conduit runs, and should be securely anchored at each end.

Now is also the time to get the proper power feed to the shack. Install a subpanel off the main house panel, a 100 amp panel would be good. 100 amp panels are about as cheap as smaller panels so you might as well use one. Equip it with a prominent and well marked master disconnect switch. Install \*lots\* of outlets. You can never have enough. Install outlets at the normal floor level \*and\* at bench height.

Now is also the time to install CATV and Ethernet cabling all over the house. Alarm wiring goes in now too. Run several extra twisted pairs into each room. These can be used for "smart house" connections in the future.

Gary

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Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

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Date: Thu, 21 Jul 1994 20:19:01 GMT

From: hearst.acc.Virginia.EDU!murdoch!brain.neuro.virginia.edu!esh6n@uunet.uu.net

Subject: Building a house: Special Considerations?

To: ham-homebrew@ucsd.edu

I just built a house and put conduits in the walls, tubes thru the

(poured) concrete basement walls.

An additional thing I'd do is:

a run of #4 or larger copper wire or 1/2 inch copper pipe entirely around the house with a ground rod at the electrical service entrance and another ground rod at the closest point to the antenna entrance with heavy pigtail up from that rod to the shack.

I agree about the two circuits into the ham shack. I've got 3 circuits, two 120v and a 240v. If you have lots of lightning, you might want an easy disconnect for the shack circuits. Not breakers, but large-gap switches. This so you can disconnect everything when storms approach.

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=====
Ned Hamilton                NTC                Department of Neurosurgery
nedh@virginia.edu          University of Virginia
=====

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Date: Fri, 22 Jul 1994 02:37:42 GMT  
From: newsflash.concordia.ca!CC.UMontreal.CA!poly-vlsi!nick@uunet.uu.net  
Subject: Does anyone have info on QEX?  
To: ham-homebrew@ucsd.edu

In article <30kdq3\$m4l@search01.news.aol.com> paulbreed@aol.com (PaulBreed) writes:

>I have seen many referances to QEX lately, and I don't know what it is  
>about and who publishes it?

>  
>Thanks in Advance

QEX is published by the ARRL, the same people who publish QST. They are in Newington CT.

Nick

--

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*****
*      Nick Ciarallo      *
*      SR Telecom Inc.    telephone: 514-335-2429  ex: 438      *
*      Microwave Group    facsimile: 514-334-7783      *
*      8150 Trans Canada Hwy internet : nick@vlsi.polymtl.ca      *
*      St. Laurent, Quebec hamradio : ve2hot@ve2fkb.pq.can.na      *
*      Canada H4S-1M5      *
*****
*      Accept no substitutes, *REAL* ham radio lives on 220 MHz!      *
*****

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Date: Fri, 22 Jul 1994 05:51:01 GMT  
From: ihnp4.ucsd.edu!agate!howland.reston.ans.net!vixen.cso.uiuc.edu!  
newsfeed.ksu.ksu.edu!moe.ksu.ksu.edu!osuunx.ucc.okstate.edu!cherokee.nsuok.edu!  
peaster@network.ucsd.edu  
Subject: HELP ME MOD A 2m FM AMP FOR SSB  
To: ham-homebrew@ucsd.edu

I have a Motorola commercial grade amplifier tuned to the two meter band. I have tried to use it on side band.... but, of course the relay started chattering. I need help modifying the relay so it will stay open a bit longer. I have heard that it is possible to put a capacitor or a resistor across the relay terminals..... Is this correct? If so, what values...and exactly where? Any other Ideas? If so please send me E-Mail at Peaster@Cherokee.NSUok.edu (our net news is not always up and running so an E-Mail response would be \*GREATLY\* appreciated!)

Thanks & 73'S  
Mike Peaster  
KC5BNC  
Peaster@Cherokee.NSUok.edu

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Date: Thu, 21 Jul 1994 14:58:02 GMT  
From: ihnp4.ucsd.edu!swrinde!emory!rsiatl!ke4zv!gary@network.ucsd.edu  
Subject: LF Band experience?  
To: ham-homebrew@ucsd.edu

In article <J++wavp.vimx@delphi.com> vimx <vimx@delphi.com> writes:  
> I have been experimenting with AM on 184.3 Khz. I use a 1.843 Mhz TTL  
> oscillator connected to a 4017 decade counter chip to generate  
> the carrier, which I then filter and modulate and amplify and into the antenna.  
> It sounds good on the receiver but no matter what I use as an antenna or how  
> much power I put into my output stage It doesn't go further than around the  
> block. I wonder if this frequency is by nature not as strong as CB for example.  
> I use a water pipe as ground and a fence as an antenna. I wonder if a variable  
> transformer (similar to a variac but for 100Khz) would help.

At this frequency, vertical antennas work much better than low long wires, actually \*short\* wires in this case, a halfwave antenna would be over 1.6 km long. Since there's a length limit of 15 meters in the rules, you're going to have to use a heavily loaded antenna to reach resonance, capacitance top hats are a big plus. To hold down losses, the antenna has to be very high Q. The Q will be so high that the AM sidebands will be off resonance. This does bad things to frequency response. Limiting the modulation sidebands to a few Hertz will work better. That implies CW or data modulation rather than

voice.

To achieve sufficient Q, you need to do things like use all silver plated materials, silver plated Litz wire is best, and use basketweave style coils to reduce parasitic capacitance. The ground system is critical, a water pipe isn't nearly good enough. A broadcast style 200 radial system isn't even good enough unless it's augmented by copper screening laid around the base of the antenna. Every joint needs to be welded rather than soldered. The resistance of a soldered joint will introduce too much loss.

(This may be an application for the mythic crossed field antenna design.)

> If I seem a little weird its because I am an expert on computers but I can't  
> build a radio. (I can build a computer though). I  
> would like to see how your project turns out. One more question though, is it  
> IMPOSSIBLE to make an effective LF HT?

Yes, if you want any reasonable range. A range of a few hundred feet is possible with a reasonable HT, but to reach out hundreds of miles you need an antenna system similar to the one described above. Routine data transmission over 1,000 mile paths is possible, but the data rate needs to be very low, and coherent detection techniques need to be used. The signal will be totally inaudible to the human ear over such distances due to atmospheric and manmade noise.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

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Date: 22 Jul 94 20:36:02 GMT  
From: news-mail-gateway@ucsd.edu  
Subject: Reply to FFT Question  
To: ham-homebrew@ucsd.edu

Here is a reply to the FFT question. I have taken many liberties here to simplify what REALLY happens. I have always considered Fourier transforms to be magic too!

Put simply an FFT is a numerical way of doing a Fourier transform(i.e. on a computer). It sounds like you might also want to know how a Fourier transform is done. Any Fourier transform is a convolution of the sampling function and the data to be converted. For a continuous

Fourier transform this involves the multiplication and integration of a unit impulse and the data from  $-\infty$  to  $+\infty$ . A FFT is a numerical approximation of the integration process from  $-\pi$  to  $+\pi$  radians. Part of the magic is that the function used to do the convolution is a complex function whose value is  $\sin(x) + j\cos(x)$  (or some such. Look it up in a book).  $j$  is the EE way of saying imaginary (complex numbers).

This can be done in basic, because I have done it, but it isn't pretty. The problem comes from having to do complex arithmetic in a language that wasn't designed to do it. The other problem is that the sheer number of multiplications and additions can cause a BASIC interpreter to run out of range in the numbers produced. A lot of BASIC's use 32 bit numbers for their floating point. There are books in most university libraries that will give you the algorithm for doing a FFT. I have found only one or 2 that make the algorithm understandable, though. The output of the FFT is TWO arrays of values! One is the real array of values and the other is the imaginary values. Usually, a program will convert the real and imaginary into magnitude and phase arrays (remember rectangular to polar conversions?) which are of more use to most engineering types.

I do this kind of stuff for a living and it still makes my brain hurt thinking of it.

The diagram you saw in the textbook illustrates something called a butterfly function, which takes advantage of the symmetry and duplication involved in doing a DFT when the number of samples is a power of 2.

I believe that there was an article or 2 in BYTE back in the early 80's on doing a FFT in basic. You could find those articles and use them as a guide, but beware that one of the articles has a program with bugs in it!.

> the samples have been magically replaced... How does it do that?

This is the definition of what a Fourier transform does. You can plot a periodic waveform as amplitude vs. time ( $-\infty$  to  $+\infty$ ), or you can plot the component frequencies AND phases for all frequencies from  $-\infty$  to  $+\infty$ . BOTH representations describe the same physical phenomenon and they are exactly equivalent to each other.

An interesting example:

If you have studied any radio or electronics you may have heard that a square wave is composed of all of the odd harmonics of the fundamental





: >the amplifier.

Answer is simple.... 1) disconnect the antenna and 2) don't use the amplifier.

: >73,

: >

: >chris <=== callsign???

: >Houston tx.

: >

: Are we being asked to give advice on a KW amp for the Citizens Band?

No more than likely just a couple hundred watts. If it had been a full gallon, then chris might have been asking about the longterm effects of severe RF burn.

: 73 Steve AB4EL ab4el@Cybernetics.NET

\* 10-4! John Wa0lhb in das Fort.

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Date: Thu, 21 Jul 1994 18:13:26 GMT

From: ihnp4.ucsd.edu!usc!howland.reston.ans.net!swrinde!elroy.jpl.nasa.gov!lll-winken.llnl.gov!fnnews.fnal.gov!gw1!nntpa!devildog!newsadm@network.ucsd.edu

Subject: Two-meter satellite CW transmitter

To: ham-homebrew@ucsd.edu

I'm looking for a simple two-meter CW transmitter for use on RS-10. I can't use a crystal controlled transmitter because the protocol on RS-10 requires that the two-meter uplink signal be changed slowly during the QSO so as to maintain a constant downlink frequency.

Does anyone know of any plans, kits, schematics, or outright rigs-for-sale with a non-crystal controlled two meter CW transmitter?

Doug KA2UPW

doug@acpy01.utsd.att.com

Above opinions are my own and not necessarily those of AT&T.

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Date: Thu, 21 Jul 1994 22:03:36 GMT

From: ihnp4.ucsd.edu!usc!math.ohio-state.edu!darwin.sura.net!fconvx.ncifcrf.gov!mack@network.ucsd.edu

Subject: VHF SWR meter

To: ham-homebrew@ucsd.edu

In article <30idfg\$iks@charm.magnus.acs.ohio-state.edu> sbertsch@magnus.acs.ohio-state.edu (Steve Bertsch) writes:

>Can someone point me to any construction articles on VHF SWR meters? It  
>doesn't have to be fancy, or even provide any calibrated power readings;

It does have to be accurate though in the sense that it reads 0 when the line is terminated in 50ohms. I've built several based on strip lines etched onto PC board (that was 20yrs ago) using designs similar to those found in the RSGB manual. As long as the impedance on the strip lines is correct then the board is precalibrated. I never got the tranformer type (wound on toroid) to work.

BTW I buy the Daiwa ones now, they have those neat twin needles.

Joe Mack NA3T mack@ncifcrf.gov

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Date: Thu, 21 Jul 1994 17:22:19 GMT  
From: ihnp4.ucsd.edu!usc!nic-nac.CSU.net!charnel.ecst.csuchico.edu!csusac!  
csus.edu!netcom.com!greg@network.ucsd.edu  
To: ham-homebrew@ucsd.edu

References <1994Jul20.180443.15129@galileo.cc.rochester.edu>,  
<Ct9KrJ.EGG@wb6hqq.uucp>, <Ct9z5F.54u@news.Hawaii.Edu>m  
Subject : Re: LF regs?

In article <Ct9z5F.54u@news.Hawaii.Edu> jeffrey@kahuna.tmc.edu (Jeffrey Herman) writes:

>In article <Ct9KrJ.EGG@wb6hqq.uucp> bart@wb6hqq.uucp (Bart Rowlett) writes:  
>>

>>Here is part 15.217 of the FCC regulations.

>>

>>15.217 Operation in the band 160 - 190 kHz

>>

>>(b) The total length of the transmission line, antenna, and ground lead  
>> (if used) shall not exceed 15 meters.

>

>Because of this particular limitation many experimenters place the  
>xmtr directly at the base of the antenna (no transmission line).

It sort of surprised me that the little Lowfer rig in QST (April? '94) didn't have the rf portion out at the antenna. This seems like the most basic expedient for legal success on this band.

Greg

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Date: Fri, 22 Jul 1994 02:46:46 GMT  
From: psinntp!arrl.org!zlau@uunet.uu.net  
To: ham-homebrew@ucsd.edu

References <9407110930.aa16788@argos.ee.surrey.ac.uk>,  
<1994Jul17.142908.2163@arrl.org>, <1994Jul19.052459.1@ccsvax.sfasu.edu>  
Subject : Re: RSGB BOOK

James Speer K5YUT (f\_speerjr@ccsvax.sfasu.edu) wrote:

: Good textbook writing is, in my opinion, harder. In addition to trying to be  
: clear and complete, you also have to be interesting. That means, among other  
: things, a lot of variation in sentence length, and a strong preference for the  
: active voice. It is so EASY to write, "In this study, the children were  
: presented with xyz stimuli, then required to do abc in response." It is so much  
: less natural for a scientist, but so much more engaging, to write, "In this  
: study, the children saw xyz, and responded with abc."

Yes, and the complexity of electronics makes it that much harder. Actually,  
it isn't so much the fact that it is complex, but the fact that some people  
do in fact have an amazingly deep grasp of their province of it.  
Thus, the challenge is accurately conveying that expertise, without  
misleading people. For instance, Dr. Rhode recently remarked upon the  
clipping diode used in an FET oscillator which resulted in a whole bunch of  
erroneous conclusions by the amateur community. I can say that I have no  
intention of attempting to improve the phase noise of an oscillator  
circuit is probably superior to that found in most transceivers today.

: I guess it's true that a good editor could convert the one to the other, but I  
: can tell you for sure, mine doesn't have time to do so. We talk from time to  
: time about rhetorical strategies, but getting it right is on my nose, not his.

Nor do some authors appreciate the attempts at a conversion. I know of  
at least one well published author who says he carefully crafts every  
word, and doesn't want changes. Not surprisingly, most of his articles  
were published in a magazine that did little editing.

Interestingly, I'd say the introduction of the computer into the hamshack has  
apparently had little effect on the amount of articles being written for  
amateur magazines. It has enabled a few authors to write rather lengthy  
articles :-).

--

Zack Lau KH6CP/1

2 way QRP WAS  
8 States on 10 GHz

Internet: [zlau@arrl.org](mailto:zlau@arrl.org) 10 grids on 2304 MHz

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End of Ham-Homebrew Digest V94 #206

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